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ABSTRACT

A study at Iona College (New York) analyzed the impact of demographic, socioeconomic, and financial factors on the enrollment behavior of accepted college applicants. The data base consisted of observations on accepted applicants to the college for the 1991-92, 1993-94, and 1995-96 academic years and included 2,198, 2,553, and 2,353 students (respectively). Regression analysis of the data yielded the following results: (1) Upper income applicants were least likely to enroll; (2) based on SAT scores, Iona attracted better students in 1995-96 than in 1991-92; (3) for every $1,000 increase in the amount of financial aid offered, the probability of enrollment increased between 1.1 and 2.5 percent; (4) while each $1,000 increase in student loans raised the probability of enrollment to more than 5.0 percent, a similar increase in grant money enhanced enrollment prospects by only 3.0 percent; (5) financial aid solely in the form of work-study did not appear to entice prospective students, but, particularly in the latest period, work-study support did contribute to an attractive financial aid package when mixed with grants and loans; and (6) combinations of financial aid types must contain some grant money to be attractive to accepted applicants. Data tables for each cohort are included. (Contains 20 references.) (MAB)

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Running head: ENROLLMENT DECISIONS

Measuring the Impact of Income and Financial Aid Offers on College Enrollment Decisions

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Abstract

This study analyzes the impact of demographic, socioeconomic, and financial factors on the enrollment behavior of accepted college applicants. The receipt of financial aid did have a positive impact on the enrollment decisions of accepted applicants. For every $1,000 increase in the amount of aid offered, the probability of enrollment increased between 1.1 and 2.5 percent. Grants and loans had the expected positive impact on enrollment, but work-study did not entice prospective students unless it was packaged with some grant or loan assistance. Upper income applicants were less likely to enroll at this institution regardless of financial aid incentives.

Measuring the Impact of Income and Financial Aid Offers on College Enrollment Decisions

Introduction and Literature Review

The enrollment of accepted applicants and the strategic leveraging of financial aid continue to be major concerns of many colleges and universities in the United States. The conversion of applicants to enrolled students has become more important as overall competition for promising students continues, prompting recruitment and retention efforts to assume a more vital role. The successful conversion of applicants is critical in an environment of rising tuition, decreasing financial aid, and a greater reliance on loans rather than grants in the financing mix. Consequently, the role of financial aid in the conversion process has received heightened attention.

Since the late 1980s, numerous studies have focused on the effect various tuition and financial aid policies have on students' college enrollment and persistence decisions. Both year-over-year and within-year student persistence behavior have been analyzed. The more recent major studies in this area encompass the works of Leslie and Brinkman (1988), St. John (1989a, 1989b, 1990b), St. John, Andrieu, and Oescher (1992), Cabrera, Nora, and Castaneda (1992), and St. John, Andrieu, Oescher, and Starkey (1994) among others. However, the purpose of this study is not to examine the effect of financial factors on college persistence. Instead, this research analyzes the impact of financial factors on the actual college enrollment of accepted applicants.

A related collection of works concerned with the enrollment impact of tuition and financial aid policy has evolved in tandem with persistence studies. Generally, the factors believed to have a significant effect on enrollment decisions fall into two subsets: (1) academic, biographic, demographic, and institutional variables including such factors as age, gender, ethnicity and race, high school experience and grade point average, marital status, parents' educational levels, and scores on standardized tests such as the Scholastic Aptitude Test (SAT) and the American College Test (ACT); or (2) economic and finance variables including cost of tuition, family income, student aid in the form of scholarships, grants, loans, and work-study, and unmet financial need. Major results from the recent literature focusing on the enrollment issue include the following:

1. All forms of financial aid (i.e., grants, loans, and work-study) positively impact enrollment (St. John, 1990a, 1993; St. John & Somers, 1993).

2. Financial aid has more of an impact on student enrollment decisions than tuition (St. John, 1990a, 1992, 1993, 1994), although students are sensitive to tuition charges (St. John, 1990, 1990b, 1993).

3. Low-income students are more responsive to grants than they are to loans or work-study (Carlson, 1975; Leslie & Brinkman, 1988; St. John, 1990a, 1992, 1993, 1994).

4. Middle income students are more responsive to loans than they are to grants or work-study (Carlson, 1975; St. John, 1990a, 1992, 1993, 1994).

5. High-income students were not significantly responsive to any form of financial aid, and were only marginally affected by tuition changes (McPherson & Shapiro, 1989; St.

John, 1990a, 1993, 1994).

6. Minority enrollment rates have lagged as financial aid emphasis has shifted from grants to loans as tuition has escalated (St. John, 1989, 1992, 1993).

7. Financial aid factors also affect students' attitudes, perceptions, satisfaction, and social integration, as well as other intangible and subjective elements which impact enrollment and persistence behavior (Cabrera, Nora, & Castaneda, 1992).

8. Large scholarships do attract students, but a "Robin Hood" approach (i.e., more evenly distributing the financial aid budget to deserving students) may provide more long-term enrollment success (Somers, 1993; St. John, 1994).

Except for number seven above, the vast majority of these results were based on national cross-sectional (longitudinal) pre-1990 data. Additionally, there has been an obvious need and persistent request for more contemporary singular institutional research (St. John, 1992, 1993, 1994; St. John & Somers, 1993). The intent here is to fill this void in the literature.

This particular enrollment analysis employs data for first-time accepted applicants to Iona College -- a medium-sized, private, liberal arts, suburban, commuter institution located in the State of New York -- for three recent years. The model employed in the study adheres to the one recommended by St. John (1992) and St. John, Andrieu, and Oescher (1992) in terms of analytical technique. It also includes many of the suggested pertinent explanatory variables. The objective of this study is to augment the existing literature that focused on the effect financial factors have on student enrollment behavior

based on cross-sectional data with a singular institutional analysis employing more contemporary data.

The paper proceeds as follows. Section 1 provides a description of the data and the methodology employed in the enrollment analysis. The various models to be investigated along with a discussion of the measurement of variables are presented in Section 2. Results of the study are displayed in Section 3, accompanied by a discussion of the major implications. Section 4 provides a concluding summary and recommendations for further research.

Data and Methodology

The data base consists of observations on accepted applicants to the college for the 1991-92, 1993-94, and 1995-96 academic years. The sequence of alternate years was influenced by the desire to capture enrollment decisions of a more diverse pool of applicants as the college significantly altered its recruitment strategies in the later period. The number of observations in the 1991-92 period totaled 2,198, with 2,553 and 2,353 accepted applicants observed in the respective subsequent periods.

The demographic or social background variables reflected in the analysis include race, ethnicity, gender, number of family members, progeny of an alumnus, proximity to campus, and whether applicants intend to be commuter or resident students. The academic achievement or academic preparation variables include average high school grade percentage, SAT mathematics, verbal, and combined scores (pre-recentering), and anticipated arts and science or business major. Lastly, the financial variables consist of

family income, the dollar amount of financial aid offered, the types of financial aid in the form of either grants, loans, or work-study opportunities, as well as some package of these financial aid types.

This collection of institutional data adheres to the enrollment model recommendations of St. John (1992), and facilitates a meaningful comparison with the enrollment analysis of St. John and Somers (1993). The latter study was based on observations of 2,558 accepted applicants of an urban, public, commuter college in 1989. Consequently, the data bases are markedly similar except for the period under study. The internally generated data used here also advances the earlier work of St. John (1990a) that was based on the High School and Beyond longitudinal data of 1982-84. That data consisted of self-reported financial aid offered to first-time college applicants which is often less reliable.

Conventional logistic regression analysis is utilized with the dichotomous dependent variable capturing whether or not accepted applicants actually enrolled at the college. Traditional delta-p statistics reflecting the change in the probability of enrollment associated with various demographic, academic, and financial factors are obtained. Results are generated for each of the three academic years separately because the college significantly changed its admissions policies during the academic years 1991-92 to 1995-96. During this period, the minimum combined SAT score required of viable applicants was raised 150 points along with a five percentage point increase in the requisite high school average grade percentage. However, the financial aid policies of the College changed very little over this period.

The Models

A discussion of only the variables that are not obvious in their measurement follows. All of the demographic or social background variables are measured in a traditional manner; with race, ethnicity, gender, alumnus progeny, and commuter or resident status captured by dichotomous variables. The academic achievement variable, high school grade percentage, reflects the typical grading scale with 100 percent signifying perfection, while the SAT variables represent the numeric test scores.

The SAT composite variable is measured by two methods. First, the simple numeric overall test score is employed. In the second approach, and consistent with many of the existing studies, the composite SAT score is dichotomized into a high range (i.e., approximately 30% of accepted applicants), middle range (i.e., the uncoded control group. consisting of approximately 40% of accepted applicants), and a low range (i.e., approximately 30% of accepted applicants). The results are remarkably consistent under both methodologies, and the dichotomized approach is included in the reported results to maintain consistency with the existing literature.

The financial aid and income variables are measured by the two methods suggested by St. John (1992). First, family income, the dollar amount of financial aid, and the types of aid in terms of grants. loans, and work-study are initially measured in nominal dollar terms. Second, merely the existence of financial aid, financial aid type, and financial aid package (grant plus loan, grant plus work-study, loan plus work-study, and grant plus loan plus work-study) are captured by dichotomous variables. However, similar to previous works concerned with the impact of family income and financial aid on enrollment

decisions, the data base consists of a substantial number of cases with no reported family income, reflecting accepted applicants who did not apply for financial aid. (Those cases were as follows: 901 out of 2,198 applicants in 1991-92; 880 out of 2,553 applicants in 1993-94; and 897 out of 2,353 applicants in 1995-96). This substantial block of omitted income observations is accommodated by employing a technique suggested by St. John (1992), which proved to be successful in most of the other college enrollment and persistence studies.

A set of three dichotomous variables is constructed based on family income levels. All applicants of families who either did not apply for financial aid (and consequently reported no income) or who had family income exceeding $85,000 were categorized as the control group. In essence, this group reflects the more wealthy applicants who did not apply for financial aid or who were likely to receive little, if any, aid under normal circumstances. The remaining lower family income levels comprised the set of three dichotomous variables: $1-$24,999; $25,000-$49,999; and $50,000-$84,999. These three income level subsets were deemed appropriate since they provided a rather uniform distribution of observations across the income subsets, and generally equally divided the observations between the control group and dichotomous variable set. Equivalent characterizations of the income subsets are: high financial need (low income), moderate financial need (medium income), low financial need (high income), and no financial need (wealthy control group).

The complete model is estimated in stages to more fully illuminate the impact that the salient income and financial aid variables have on the enrollment decisions of accepted applicants. It should be noted that none of the demographic or social background variables were even remotely significant in any of the preliminary simple regression models, and consequently are not included in any of the reported results. This finding may be comforting to administrators who are striving to maintain a diverse student population by attracting students from various demographic and socioeconomic spheres in an effort to provide a more complete and culturally rich educational experience. Also, the academic The SAT composite score dominates achievement and preparation variable set variable, and therefore only this measure of academic preparation is included in the reported models.

In an attempt to more completely replicate the analysis of St. John and Somers (1993), the mere existence of financial aid, rather than the actual dollar amount, is captured with a dichotomous variable. However, the preponderance of dichotomous variables when the mere existence of financial aid is included with the family income dichotomous variable set results in severe multicollinearity problems. It is conceivable that near perfect multicollinearity could exist between the wealthy control group and the absence of any financial aid offer, making this model infeasible.

Results

The results of the logistic regression analyses are displayed in Tables 1, 2, and 3 for the sequence of academic years 1991-92, 1993-94, and 1995-96.

The constant term is consistently negative and highly significant throughout the analysis. Note that there is no meaningful delta-p statistic associated with a constant term. Recall that this constant term captures the enrollment behavior of the control group -- reasonably wealthy applicants who did not apply for financial aid along with the applicants with family incomes exceeding $85,000. The upper income applicants are less likely to enroll at this institution. Also note that the college is located in affluent Westchester County in the State of New York. It is possible that upper income applicants residing in the area might be considering the college as a fallback or safety institution when applying to other schools.

Certainly, the competition for students who have achieved higher SAT scores is intense among many colleges and universities seeking a highly qualified and academically capable student body. This institution does not seem to attract the more accomplished SAT performers and appears to be at a relative disadvantage in competing for this group. However, the college does appear to be attracting better students in the more recent 1995-96 period as reflected by the smaller delta-p statistic for the low-range SAT applicant, and a larger (less negative) delta-p measure for the high range SAT applicant, compared to the earlier 1991-92 academic year.

The receipt of financial aid does have a positive impact on the enrollment of accepted applicants. For every $1,000 increase in the amount of financial aid offered, the probability of enrollment increases between 1.1 and 2.5 percent. Although this probability increase is smaller than the 6.2 percent response of the St. John and Somers study (1993), financial aid is highly significant in the enrollment decisions of accepted applicants.

Grants and loans both had a positive impact on enrollment (reflected in Model #3), especially in the later periods. Generally, for each $1,000 increase in a student loan, the probability of enrollment rises over 5.0 percent; while a similar increase in grant money enhanced enrollment prospects by over 3.0 percent.

Consistent with the results of earlier research, financial aid solely in the form of work-study does not appear to entice prospective students. St. John and Somers (1993) reported that financial aid in the form of work-study had no significant impact on enrollment, and an earlier study by St. John (1990a) revealed at best a weak influence of work-study aid on the enrollment decision. Also, St. John et al. (1994) reported that financial aid in the form of work-study had no significant impact on student persistence. It appears that work-study, as the sole source of financial aid is not an effective recruitment tool. However, particularly in the latest period, when packaged with grants and loans (Model #4), work-study support does contribute to an attractive financial aid package. It appears that combinations of financial aid types must contain some grant money to be attractive to accepted applicants. It should be noted that modeling financial aid packages along with the family income and SAT variables suffers from the extensive use of dichotomous variables, which leads to multicollinearity concerns.

Accepted applicants from each of the family income levels are more likely to enroll relative to the control group (Model #1), although family income is generally less significant when measures of financial aid are included in the analysis (Model #2). Since there is generally an inverse relationship between family income and the amount of financial aid, it is not surprising that income becomes less significant in the enrollment

decision once financial aid variables are included. The receipt of financial aid tends to mitigate the effect of income on the applicant's ability to meet educational expenses such as tuition, room and board, and various fees. The falloff in the impact of family income on enrollment is especially true in the most recent period (comparing Model #1 and Model #3 for the 1991-92 and 1995-96 periods), and when considered with the trend in the SAT measures discussed earlier, it appears that the College's refocused recruitment efforts have attracted a somewhat more academically qualified and affluent student.

The financial aid policy of the College remained consistent during the period under study, but as detailed earlier, there were notable upgrades in admissions criteria. These refocused recruitment efforts seem to have been successful in attracting a more well-prepared and somewhat more affluent student. Consequently, loans became a more attractive component in the mix of financial aid incentives (as reflected by steadily increasing delta-p statistics associated with the loan variables of Model #3 over time), while grant money, although still important, exerted a smaller influence on the enrollment decision (reflected by marginally declining delta-p statistics associated with the grant variable over time). However, these results are consistent with those of prior research (recall the literature summary on page four above) where it is revealed that low income applicants are more responsive to grant money, middle income applicants are most responsive to loan assistance, and high income applicants tend to be the least responsive to any form of financial aid. The trend in the impact of loan and grant money on enrollment is consistent with the College's heightened appeal to more affluent applicants.

Note that in all of the periods that were investigated in this study, there is a reduction in unexplained error (as reflected by a larger pseudo R squared statistic) whenever a financial aid variable (measured by either dollar amount, type, or package) is included in the model. Yet, the improvement in explanatory power is greatest in the model that separated the financial aid award into the respective grant, loan, and work-study components (Model #3). The percent of enrollment predicted correctly remained reasonably steady in the low-to-mid 70 percent range in all of the reported models, although Model #3 exhibited the most accurate predictive capability.

Summary and Recommendations

Rather than rely on findings in the related literature or on institutional analyses which are dated, colleges and universities may want to conduct more research which is both singular and contemporary. Thus, at the end of each academic year, the role of financial aid in the most recent conversion effort can be examined for effectiveness by institutional researchers working in conjunction with admissions and financial aid administrators. This recommendation is meritorious because the results of the strategic leveraging of financial aid may vary over time based on changes in the amounts of students' financial need, as well as the amounts and types of financial aid offered. This kind of research is especially critical for tuition-driven institutions which have modest operating budgets, small endowments, limited financial aid funds, and student populations which come from the lower and middle socioeconomic classes.

When conducting inquiries which measure the impact of income and financial aid offers on enrollment decisions, it is also recommended that institutional researchers utilize analytical models similar to those developed by St. John (1992), St. John, Andrieu, and Oescher (1992), and St. John and Somers (1993). In this way, researchers can provide admissions and financial aid practitioners with a credible institutional model based on other successful enrollment studies.

For the particular institution employed in this study, it was found that the receipt of financial aid did have a positive impact on the enrollment of accepted applicants. For every $1,000 increase in the amount of aid offered, the probability of enrollment increased between 1.1 and 2.5 percent. Grants and loans had the expected positive impact on enrollment, but work-study did not entice prospective students unless it was packaged with some grant or loan assistance. Upper income applicants were less likely to enroll at this college regardless of financial aid incentives, and it is possible that upper income applicants use the college as a fallback or safety institution. For institutions similar to that analyzed here, this result may assist in formulating policies intended to recruit and retain more qualified students, as studies show a correlation between socioeconomic background and academic achievement (e.g., Astin, 1975; Orfield, 1992).

Lastly, since the retention of enrolled students also continues to be a major concern for many colleges and universities in the United States, more examination is needed to explain what specific types and amounts of financial aid improve students' persistence. In fact, researchers have conducted inquiries which measure the impact of income and financial aid offers on the rates of student attrition and retention (e.g., Astin, 1975;

McGrath & Braunstein, 1997; St. John, 1989a, 1990a; St. John, Andrieu, & Oescher, 1992; Tinto, 1987, 1993). Some of these studies have shown attrition rates of 10 percent to 80 percent (Astin, 1975; McGrath & Braunstein, 1997; Tinto, 1987, 1993). Therefore, more than ever before, institutional researchers and admissions and financial aid administrators must view not only the strategic leveraging of financial aid for recruitment, but also for retention as an equally important aspect of enrollment management.

Table 1 - ENROLLMENT ANALYSIS: ACCEPTED APPLICANTS 1991-92

Variable	Model 1 Delta-p	Model 2 Delta-p	Model 3 Delta-p	Model 4 Delta-p
Constant	^	^	^	^
SAT –low	.1566**	.1640**	.1764**	.1581**
SAT – high	-.0229	- .0359	-.0933**	-.0263
Family Income				
Low	.2966**	-.0077	.0194	.2809**
Medium	.2895**	.0531	.1654**	.2820**
High	.2697**	.1186**	.2109**	.2599**
Financial Aid				
Dollar Amount		.0253**		
Financial Aid Type				
Grants ($ amount)			.0472**	
Loans ($ amount)			-.0006	
Work-study ($ amount)			-.0845**	
Financial Aid Packages				
Grant + Loan				.0591
Work-study + Loan				-.1539
Grant + Work-study				.0373
Grant + Loan + Work-study				-.0056
Model Chi-square (d.f.)	195.2** (5)	256.2** (6)	337.4** (8)	200.3** (9)
Pseudo R squared	.0735	.0965	.1271	.0754
% of Correct Predictions	71.4%	71.3%	73.5%	72.4%

Baseline p = .292

^ All constant terms are negative and highly significant, and there is no meaningful delta-p statistic associated with this term .

* Significance Level = .05

** Significance Level = .01

Table 2 - ENROLLMENT ANALYSIS: ACCEPTED APPLICANTS 1993-94

Variable	Model 1 Delta-p	Model 2 Delta-p	Model 3 Delta-p	Model 4 Delta-p
Constant	^	^	^	^
SAT –low	.0502**	.0681**	.0446*	.0471*
SAT – high	-.0250	- .0398	-.0723**	-.0381
Family Income				
Low	.1691**	.0619*	-.0602	.0278
Medium	.2385**	.1180**	.0593	.0852**
High	.2076**	.0810**	.0689*	.0473
Financial Aid				
Dollar Amount		0117**		
Financial Aid Type				
Grants ($ amount)			.0379**	
Loans ($ amount)			.0537**	
Work-study ($ amount)			-.1784**	
Financial Aid Packages				
Grant + Loan				.4039**
Work-study + Loan				xxxx
Grant + Work-study				.0799
Grant + Loan + Work-study				.0091
Model Chi-square (d.f.)	106.3** (5)	161.1** (6)	509.0** (8)	373.0** (8)
Pseudo R squared	.0377	.0572	.1807	.1323
% of Correct Predictions	75.9%	75.7%	77.6%	76.7%

Baseline p = .241

^ All constant terms are negative and highly significant, and there is no meaningful delta-p statistic associated with this term .

* Significance Level = .05

** Significance Level = .01

xxxx There were none of these packages in 1993-94

Table 3 - ENROLLMENT ANALYSIS: ACCEPTED APPLICANTS 1995-96

Variable	Model 1 Delta-p	Model 2 Delta-p	Model 3 Delta-p	Model 4 Delta-p
Constant	^	^	^	^
SAT –low	.0477*	.0782**	.0921**	.0631**
SAT – high	.0388	- .0131	-.0563*	.0262
Family Income				
Low	.1656**	-.0359	-.1184**	-.0531
Medium	.2194**	.0224	-.0506	-.0154
High	.2475**	.0602*	.0447	.0149
Financial Aid				
Dollar Amount		.0223**		
Financial Aid Type				
Grants ($ amount)			.0367**	
Loans ($ amount)			.0544**	
Work-study ($ amount)			.0188	
Financial Aid Packages				
Grant + Loan				.3968**
Work-study + Loan				-.2356
Grant + Work-study				.6729**
Grant + Loan + Work-study				.4030**
Model Chi-square (d.f.)	103.9** (5)	261.7** (6)	331.6** (8)	274.7** (9)
Pseudo R squared	.0394	.0993	.1258	.1042
% of Correct Predictions	75.2%	75.6%	77.2%	75.4%

Baseline p = .248

^ All constant terms are negative and highly significant, and there is no meaningful delta-p statistic associated with this term .

* Significance Level = .05

** Significance Level = .01

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